

Industry Solution Sheet: Manufacturing (Make to Stock Approach)

Challenges and Capabilities

The make to stock (MTS) or build to stock (BTS) manufacturing approach – which involves producing goods and building inventory based on forecasted consumer demand (rather than actual orders) – is utilized by companies across numerous sectors including commodities such as petrochemicals and building materials, fast-moving consumer goods such as food and beverages as well as clothing and pharmaceuticals, and durable goods such as consumer electronics and appliances.

Although the MTS approach enables companies to achieve economies of scale by mass producing goods at a faster pace and lower cost, it does present numerous planning and operational challenges including:

- Ensuring the accuracy of demand forecasts, which are used as the basis to create procurement, production, and inventory plans and drive manufacturing and distribution operations.
- Deploying critical resources (including workers and machines) in the most efficient manner possible – to maximize delivery performance and customer satisfaction while minimizing operating costs and set-up and changeover times.
- Maintaining the right amount of inventory in the right places at the right times – to avoid costly stock-outs and surpluses.
- Coping with demand uncertainty and volatility as well as production bottlenecks and disruptions.

How can companies employing an MTS manufacturing approach overcome these challenges and make sure that their production operations and inventory levels are perfectly calibrated to meet anticipated consumer demand? They must be able to use their historical and real-time data to make predictions, plans, and decisions – and to do this they need to have access to state-of-the-art advanced analytics technologies.

This process of transforming data into predictions, plans, and decisions involves two main steps:

- Predictive analytics techniques such as machine learning, neural networks, and decision trees as well as traditional statistical methods such as regression and time series are utilized to obtain accurate demand forecasts.
- Those demand forecasts are then fed into a mathematical optimization tool, which uses them as input to generate optimal production, procurement, and inventory plans across a rolling horizon. Those plans are then used to support or automate optimal decision making – which leads to optimal business outcomes.

Although the MTS manufacturing approach is driven by anticipated future demand, merely having demand forecasts is not enough. You need to be able to use those forecasts to create demand-driven plans and make decisions on how to deploy your resources – and this is where a mathematical optimization tool comes into play.

For companies in various industries across the commodities, fast-moving consumer goods, and durable goods spectrum utilizing the MTS manufacturing approach, mathematical optimization is an essential component of their advanced analytics toolbox.

Mathematical optimization empowers companies employing the MTS approach to utilize their demand forecasts to fuel data-driven optimal planning and decision making – so that they can maximize their operational efficiency, minimize costs, and match inventory with demand in the most cost-effective and profitable way possible.



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Opportunities for Optimization

Mathematical optimization enables companies using the MTS manufacturing approach to optimize many different strategic, tactical, and operational planning processes including:



Strategic

- Product Portfolio Optimization
- Capacity Planning
- Workforce Planning
- Demand Planning



Tactical

- Production Planning
- Maintenance, Repair, and Overhaul (MRO) Planning
- Supplier Selection
- Inventory Planning
- Spare Parts Inventory Planning



Operational

- Flow Shop Scheduling
- Machine and Equipment Planning
- Order Fulfillment Planning

Business Benefits

With mathematical optimization, companies utilizing the MTS production approach can boost their operational efficiency, balance the tradeoffs between conflicting business objectives, and realize numerous business benefits including:

- Greater profitability
- Reduced operating costs
- Improved resource utilization and throughput
- Reduced turnaround, set-up, and changeover times
- More efficient use of resources including workforce, equipment, budget, and energy
- Reduced inventory levels while achieving target service levels
- Improved customer satisfaction and revenue growth

